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ABSTRACT

This document is the fourth publication in a series devoted to the use of computers in counseling. The outgrowth of the 1986 ERIC/CAPS workshop, it contains four of the major presentations made at the conference. "The Impact of Computers on the Future of Counseling: Boom or Boomerang" (Edwin L. Herr) examines the effect of technology upon society and whether counselors need computerization, and offers three major perspectives on the impact of computers on the future of counseling: computers as content, as process, and as method. "Computer Use or Abuse: Ethics in the Use of Computers" (James P. Sampson, Jr.) explores the misuse of computer applications, overdependence on computer technology, and the restriction of the counseling process to the cognitive component alone. "Counselors vs. Computers: A Cost/Benefit Analysis" (Marilyn E. Maze) discusses making a cost analysis of the use of computers in counseling. "Taking the Byte Out of Computers: Strategies for Minimizing Stress" (Joseph Fisher) explains stress associated with computers and suggests steps to bring stress under control. (NB)

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THE GROWTH EDGE:

CREATIVE USE OF COMPUTERS FOR FACILITATING LEARNING AND ENHANCING PERSONAL DEVELOPMENT

Garry R. Walz
Jeanne C. Bleuer
Editors

CG 019726

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TABLE OF CONTENTS

Page

Introduction 1

Garry R. Walz and Jeanne C. Bleuer

The Impact of Computers on the Future of Counseling: Boom or Boomerang 3

Edwin L. Herr

Computer Use or Abuse: Ethics in the Use of Computers 19

James P. Sampson, Jr.

Counselors vs. Computers: A Cost/Benefit Analysis 29

Marilyn E. Maze

Taking the Byte Out of Computers: Strategies for Minimizing Stress 37

Joseph Fisher

INTRODUCTION

Garry R. Walz
Jeanne C. Bleuer

This is the fourth publication in a series devoted to the use of computers in counseling. An outgrowth of the 1986 ERIC/CAPS workshop, The Growth Edge: Creative Use of Computers for Facilitating Learning and Enhancing Personal Development, it contains four of the major presentations made at the conference. While the monograph does not include all that was relevant and important in the workshop, what it does offer is the perspective of four knowledgeable counselors on topics of concern to those who wish to use computers in counseling.

Are computers a boom or boomerang to the future of counseling is a question that Ed Herr probes in depth. Unwilling to settle for quick and easy answers, he examines the effect of technology upon our larger society and the values associated with whether counselors need computerization to survive as the professional entity we know today. He offers three major perspectives on the impact of computers on the future of counselors—computers as content or subject matter, as process, and as method. Written in his usual lucid and highly informative style, his remarks will lead the reader to make his/her own decision, but will not provide any shortcuts.

In our enthusiasm for computers, we may gloss over or downplay the ethical and professional abuses that can occur in using computers in counseling. Jim Sampson, an early analyst and careful thinker about the use of computers in counseling, asks us in a stimulating article to think beyond the technical efficiency questions in computer usage and deal with the broader questions of the misuse of computer applications, over-dependence on computer technology, and the restriction of the counseling process. His remarks may cool the ardor of the computer zealot and give substance to those who question the unrestricted use of computers in counseling.

To use or not to use computers in counseling is frequently resolved on a bottom-line basis—how much will it cost? Asking about costs, however, has often only raised the frustration level, as few guidelines exist for determining them. Marilyn Maze, a software developer in her own right, provides some highly relevant insights and information about making a cost analysis of the use of computers in

counseling. As market forces assume increasing importance in the adoption and use of computers in counseling, her ideas will become even more valuable in program decision making than they are today.

Using computers in a counseling program seldom occurs without an element of stress--sometimes and for some people of such magnitude that it is incapacitating. Joe Fisher, a psychologist experienced in human resources utilization in business and education, discusses stress in its many ramifications and offers a systematic method for viewing stress in his "Seven C's." Rather than remain content with the observation that computers may promote stress in an organization, he provides us with a means both to understand stress better and to take steps toward bringing it under control.

These articles taken together may be thought of as a multi-vitamin--not as a full meal but as a supplement to a regular diet of computer substance, they are likely to add more "vim and vigor" to a counselor's life. If they do add more energy, we also hope that they stimulate you to think about issues which you did not think about before, and with a perspective and information which will make you more satisfied with your answers.

THE IMPACT OF COMPUTERS ON THE FUTURE OF COUNSELING: BOOM OR BOOMERANG?

Edwin L. Herr

Those who argue that counselors must adopt technology to survive in the decades ahead may be unfair to the fuller need for high touch, for human contact, that occurs in our environment as counselors. On the other hand, it is unlikely, if not impossible, for counselors to avoid interface with computers, either because they represent the content of much that counselors will do, or because computer technology will become so pervasive within environments in which counselors work. Therefore, whether counselors themselves must adopt technology for survival, I think, is a values question, one which has a lot of other implications. But to avoid the notion of computerization and its effect in the larger society is probably inappropriate.

My remarks revolve around three major emphases, or three ways to look at the impact of computers on the future of counseling. They include--and these terms are a short-hand description--computers as content or subject matter, as process, and as method. As I see these emphases, they represent a context in which one can get a handle on the implications of the question we are addressing--is the impact of computers on the future of counseling a boom or a boomerang? I need to say at the outset that one cannot address that question, boom or boomerang, by looking only at counseling. One has to look at counseling within a larger socio-political climate, because counseling is a socio-political institution. We don't think about it in those ways, but its form and substance have been shaped by legislation, policy and external events over the last 100 years, and that will continue to be the case. Thus, the content with which counselors must deal comes out of the external environment, the interaction of people with the achievement images that occur outside the individual in the larger social context. To think about boom or boomerang, about the impact of computers on counseling only, it seems to me, is to take a micro view of a macro issue.

Let me, then, try to explain very quickly how I interpret these three emphases--first of all, the issue of computer as content or subject matter. Within this emphasis counselors need to understand the effects of computers and other

forms of advanced and high technology on the changing educational and occupational structure, on the organization and the distribution of work, on the demographics of the labor force, and, in turn, the impact of these factors on the choice possibilities for young people and adults.

Society is a spider web. It is also a large information percolator and a large reinforcement structure. Where you are in the spider web depends upon the kinds of achievement images, the reinforcement, the information you get. Unless one understands some of the factors which change and shake that spider web, that change the choice possibilities, that change the access issues, that change the kinds of reinforcements that different people get in different parts of the structure, it is frequently difficult, I think, to understand the perceptions people have of what is happening to them and why they behave as they do. This content needs to include attention to the changing psychology of work, non-work and leisure, the traumas associated with unemployment and underemployment, the implications for education and training of the emerging technological occupations, and the social implications of the computerization of America and its effects upon family structures and values, upon opportunities for the disabled and for the quality of life for many people.

For some, seeing the computer as content or subject matter is to see it as a partial or direct cause of anxiety, uncertainty, indecisiveness or other mental health problems which people bring to counselors--problems that stem from the computer's impact on jobs, access, education, equity, and personal and social environments. Trying to put the computer as content or subject matter into perspective will be a major preoccupation for the rest of my remarks.

The second emphasis, the computer as process, is related to the issue of computer literacy. As applied to the skills that counselors need, the question is, "Does this term mean to know how to turn on and use the computer, or does it mean to program it? Does it mean to create software or select it? Does it mean to think conceptually with the computer, to understand its potential?" It seems to me that each of these is a possible meaning of computer literacy for counselors, and indeed of computer as process, but it is not really clear that counselors need all of these, or which counselors need which of these, to function most effectively in their interaction with computer as process.

I think the counseling field has not yet been clear about these outcomes. It is probably a reflection of what Jim Sampson reminded us of, and that is that the use

of computers in counseling, or in education, still does not have a theory. We are very much concerned about software and about hardware. But because of the accelerated process of the introduction of computers in this country, we have not yet stood aside as effectively and as conceptually as we should to think about the theoretical perspectives of the computer in counseling, the computer as process. That becomes a very important issue for the future, as we describe what we mean by computer literacy for counselors and for which counselors under which conditions.

The third term or emphasis is the issue of computer as method. Here we see the need for the counselor to be familiar with the computer as potential, that is, its potential use as an intervention in student or client personal or career development. The question is, "How can one use the computer as a tool, as an extension of the counselor's repertoire of techniques applied to assessment and instruction, data management, career/educational guidance, exploration or research? What are the available models by which the computer can be used as an addition to other techniques, or as the primary tool to facilitate certain types of client information gathering and evaluation? How can the counselor be helped to merge knowledge of computer as process and computer as method into a system of functional intervention that can realistically target the contextual, social and developmental problems, which come to the counselor as the result of the computer as content or as the cause of individual behavior?"

Inherent in the emphasis on computer as method are issues of ethics, program planning and counselor functions. When you talk about computer as method you come to metaphors--the microcomputer as tool, or as mind multiplier, or more prosaically, as prosthesis. This is a very important intervention, extending the limits and capabilities of many people. Increasingly, computers have been put at the service of people who are disabled, whether in communication, mobility, or in mental or conceptual terms.

Each of these metaphors represents the extension of capabilities of counselors and other guidance specialists in managing client or student development, in recordkeeping, in assessment, and in expanding the limits in which one can choose and make decisions. These are terribly important issues. In addition, as computers provide information and images of what might be and how to work through these processes, they have the potential to neutralize many differences in people's life opportunities as these are related to socio-economic background, race, gender, or disability conditions.

As I said earlier, society is a large information percolator. Where you happen to be in it depends upon the images, reinforcements, information, and modeling that you receive. In that very important sense, the computer can neutralize some of those conditions and give a much more equitable view of options and opportunities than many of our other mechanisms can.

Perhaps more important, computer-based technology has the potential to empower individuals with an internal rather than an external locus of control. It says, however indirectly, "You can choose, you have options, you can make connections between the present and the future." In that sense, it not only provides information as the fuel for decision making but also says to the chooser, "You can control how you will participate in education or training and work." In such instances, it is not just a matter of using computers to educate people for choice, or about choice, but rather giving them a tool and the actual power to choose as an independent person.

Careers do not just exist. You don't go out in the parking lot and find a career. You might choose an occupation or job, but careers are forged and shaped by what one does and does not do, by the information one uses and one ignores. The distinguished philosopher Whitehead told us a long time ago that one, in fact, creates one's realities by the decisions one takes. Frequently, we do not realize and acknowledge the power of choice and the power of information, the power of visions and future options to help people shape and commit themselves to careers, to forge careers, not just to choose something which exists but to shape and to forge a life. The ability of computers to let us test possible consequences or outcomes of different choices before they are played out permits a reduction of trial and error behavior and a simulation of planful rather than random behavior. Such are the goals of counseling which are clearly affected by introducing and integrating microcomputer technology into a program as an integral element, not simply as a stand-alone or independent element or piece of hardware sitting off in a corner. I think the particular issue of program integration and conceptualization, of where the computer fits into some value sets or some set of assumptions, is a very critical part of the theoretical perspective that we still need to evolve more effectively.

Now I would like to turn back to some of the dimensions of computer as content or subject matter and talk about the interaction between computers and other advanced or high technology. I want to clarify some of the myths and

realities, from a fairly broad perspective, and then go on to more specific dimensions of computer as method.

There are really four areas in which advanced technology is likely to make a very important impact on the educational structure and certainly on the occupational structure. Each of these is interactive with computers. On the other hand, computers themselves are incredibly interactive with knowledge, and this suggests not linear but exponential progress with the incredible breakthroughs that we are on the threshold of in various knowledge-based areas. But these areas are not necessarily benign, in terms of occupations, values, the legal and philosophical structure, or other areas; we need to be aware of each of these as counselors.

One of the areas is energy. For the last decade and a half, we have been flirting with energy problems and we will continue to do so. The Persian Gulf continues to be very vulnerable. We seem to feel very secure at the moment about the price of gasoline going down and we have gluts in the world market and so forth, but that is a very dynamic situation. While it is clear there are far more resources than we need in many ways, the political implications of how those resources will be distributed continue to push us toward advanced technology--for example, fusion, fission, tar sands and shale, and numerous others which influence the development of new and interdisciplinary knowledge bases. These, in turn, have an impact on the occupational structure, help create a more conserving society, provide different kinds of images of possibilities, and so forth. And so a very major area for the application of advanced technology is in the area of materials.

Another area, a second one which I think is still an abstraction for many of us, is the biosciences. It is on the threshold of very exciting and, at the same time, very frightening developments. Genetic modification obviously can lead to the creation of new antiviral agents, new substances, new life forms, new ways to keep frost off the plants in California, and on and on. A year or so ago there were two little embryos, one of which was to be artificially implanted in a woman when both parents were killed in an airplane crash. There were all kinds of legal, ethical, and philosophical issues involved which we have only begun to deal with. All of these will affect occupations and education, but they go beyond that. So much is interactive between knowledge and computerization; we find that the transplant systems in this country, for example, are really at the mercy of computer networking to locate the right donor and make the right match to the right person at the right time within the right set of time frames. These developments are

becoming pervasive, and they are both threatening and exciting, but one has to be very clear about their impact upon the individuals in particular situations.

The third area, of course, relates to materials. We are on the verge of finding replacements for raw materials which are being exhausted. We are looking for synthetic materials, new materials, to create thermal substances for spacecraft, lighter engines, ceramic engines, and so forth. We are also on the verge of another area which is not really in materials or energy, and that is the hydrogenation of water. For a long time we have been trying to extract hydrogen from water as a renewable fuel, and Livermore Laboratory in California has finally been able to do it. It is a very expensive process at the moment. It takes very, very high heat sources. But the point is that if we are able to develop a renewable fuel for cars and other similar uses, it changes the whole set of assumptions. It gives us the kind of renewable resources to convert the deserts into farms, for example. It gives many parts of this world potable water which they do not now have. It begins to create answers to malnutrition. It creates all kinds of new occupations. As we look at the material sciences, hydrogenation or any one of these developments, the interaction between computerization and knowledge bases becomes very clear.

Certainly, the fourth area is the information sciences. This is the one which we know most about perhaps because we all have been playing with computers, which in many cases are used almost exclusively for word processing. Most of us find it difficult to know how we would survive without a memory typewriter, or a word processor, or a personal computer. These kinds of technology become very pervasive. Obviously, the microcomputer issue is tied up with microprocessing, microengineering, microcircuitry. When we think about colored television, audio systems, video gaming, video cassette recorders, personal computers and cordless telephones, all of these are advanced technology. All of them in one sense or another are a product of computerization; they may not have a computer <u>in</u> them, but they are certainly a direct result of computer product development.

What we find is that these driving forces or categories have begun to change the occupational structures in this country. The structural transitions incorporate advanced technology to a much greater degree and create an intensive impact on society. Some observers have suggested that we have been in a period of mechanization for the last century, and that is true. What is happening under the impact of computerization and advanced technology is an acceleration of adaptation. It is what Toffler has talked about, and what other people have been

talking about since the second World War. But we are just now settling in to the full impact of the repetitive, advanced, and accelerated change which the magnitude of high technology has brought about.

Obviously, when we talk about advanced technology in computerization, we mean things like microprocessors, microcomputers, industrial robots, fiber optics, telecommunications, electronic data handling, and so forth. We are also on the verge of magnetic flight--some nations have already pioneered it in their transportation systems. We are on the verge of space factories--the Soviets are allegedly training a group of children to be space colonists by 1995. They are clearly moving rapidly towards space factories. These kinds of things are no longer abstractions, they are very much in our lifetime and right before us.

When we look at advanced technology in these terms, at computerization as a driving or energy force, we can see two characteristic features. First, the objective of technological discovery, as well as their applications, is information. That is the fundamental point. What microelectronics does is to process and eventually generate information. What telecommunications do is to transmit information, with the growing complexity of interactive loops and feedback, at increasingly greater speed and lower cost. What the new media do is to disseminate information in a way potentially more and more decentralized and individualized. What automation does is to introduce pre-informed, programmed devices into other activities. And what genetic engineering does, which is perhaps the most profound of the issues, is to decode the information system of living matter and try to program it. Second, the outcomes of advanced technology are really process-oriented, rather than product-oriented. Athough products evolve from the process, it is really a process orientation, a way of thinking, and an application. When we talk about program planning and conceptualization, we are talking about process--product results, but it is process that is the major issue.

High technology, then, is not a particular technique but a form of production and organization that affects all spheres of activity by transforming operations to achieve greater productivity or better performance through increased knowledge of the process itself. What we are trying to deal with, and the questions of boom or boomerang, are really process questions. Where does this all fit together? What does this mean in terms of a new structure? What does it mean in terms of a new identity for me? What is that process interaction? Let's put it another way by considering an analogous point. If you look at some of the interesting European

literature in this area, you find that the perspective in Britain, for example, and a couple of other European countries is that the Soviet Union is not really concerned about "Star Wars" or SDI (Strategic Defense Initiative) because of its defensive shield, although that is the focus of the public discussion. What the Soviets are concerned about is that the fundamental Star Wars process is super computers in the sky, if you will. To get there, or even to get close to it, requires such new leaps in software and hardware that the Soviets are concerned. They are not worried about the defensive capability, which is surely an abstraction for decades, but the intuitive leap required by the development of super computers, the fifth and sixth generation of computers that are going to have to be put in place to make anything like that even remotely possible. These are the kinds of technological competitions which the superpowers, and indeed the secondary powers of the world, are now engaged in. The international debates are really issues of information dissemination, communication, organization, structure, etc. In the process of doing these things we have acquired a new language. Even the language of counseling is changing. We increasingly talk about artificial intelligence, digital signal processing, speech synthesis and digitization, and computer-aided design, not to mention tissue cultures, food supplements, soil-free cultures, ocean mining, controlled atmospheres, ultrasound, lasers and fiber optics. These represent the vocabulary of the future.

The point is that technology in all its excitement and impressive characteristics is not benign. These emerging technologies, however exotic they appear, are also changing the occupational structure, and therefore the educational and identity structures of the country. We are rapidly moving from the so-called smokestack industries to the so-called sunrise industries. We are moving away in this country from high volume, standardized production of durable goods and away from large, centralized management-driven, labor-intensive industries. We are moving toward industries in which we have worker participation, more precision, and more customized engineering. We have much more machine interaction, as in bioengineering, computer-controlled machine tools and robotics, new medicines, computers and fiber optics, telecommunications, and so forth. These, in turn, make changes in inventory control and retailing, transportation, banking, production, etc.

Part of the problem is the impact on low-skilled and semi-skilled jobs. In many areas, in the worst of the scenarios for the future, we will have a two-tiered

occupational structure--a very elite group of designers, research people and managers, and then a very large group of people who are really assemblers. If you look at the people who work in high technology in Silicon Valley or the Boston strip, you find that aside from the few research scientists and product designers, many of the workers are really assembly line people. They may be assembling circuit boards, but they are still dealing with assembly line processes.

The result is a deep concern about the spread between the haves and the have-nots which may, in fact, be accompanied by high technology. That is the worst scenario and certainly not the only one. But the point is that these occupations and occupational forms are changing the economy dramatically, for example, the mix of jobs. Right now in this country about 3 percent of the people are engaged in agriculture, but that also includes agri-business; and agri-business does not occur on farms, it occurs in urban areas. You have something on the order of 32 percent of the people engaged in production and about 65 percent engaged in something called services.

What we are finding is that terms like manufacturing and service are very quickly losing their identity. Manufacturing and service as we see them today will be dramatically altered by 2004. If you look, for example, at automotive or assembly line workers in a Ford or Chevy plant, in 1985 they were still doing many of the same things that their counterparts were doing for the last few decades. However, by 1990 the widespread use of robots for welding, painting, shaping and moving will have changed the role of the assembly line worker to that of a programmer or maintenance service worker. Though employed in the manufacturing part of the automotive industry, the production worker will really produce services, not cars. The same will be true throughout many aspects of the so-called manufacturing industries. What you have is a new interface with technology, even though you do not necessarily control it, but an interface nevertheless.

Another way to look at these changes is to consider the application of advanced technology to occupations where few are either emerging or in place that can truly be described as high tech occupations. In high tech industries perhaps 15 percent of the workers are in high tech occupations, that is, occupations which require a lot of math, science, engineering, research, and development skills and so forth. Most of the people in IBM, for example, are in sales, some kind of clerical support role, or fleet operations; they are not really research scientists or high tech people in the classic definition.

From a different perspective, we can see that one of the things that computerization has done in this country, and a very important one, is to rearrange our occupational and educational structures into a worldwide structure. In an occupational sense, the multinational corporations through computerization have moved their production lines, their production schedules, to a worldwide basis. One of the things that is fascinating is what that will mean in the future. One of the concerns that Business Week has been expressing for some time is that the United States is rapidly becoming a distribution economy--not a manufacturing economy, but a distribution economy. One of the classic examples is IBM, which has been a long-term American blue chip company. The fact of the matter, however, is that $625 of the $860 required to manufacture an IBM PC is "distributed offshore." In other words, computerization has allowed a multinational corporation to use countries as they formerly used satellite towns--to perform different parts of a production system, to go where resources and labor are directly available, and so forth. It certainly alters the occupational structure in this country.

Let me give one other example of that kind of notion--the deregulation of AT&T. At the time deregulation occurred, about 4 percent of the communications equipment in this country was imported; under deregulation, 31 percent was imported last year. We worry about import trade, deficits and so forth, and computerization, the ability to communicate and network globally, is part of the reason.

To go back to the technology intensive industries, we have sometimes felt that advanced technology is going to give us the opportunity to deal with unemployment. But the data do not support this--only 7 percent of all new jobs between 1980 and 1990 will be in high tech occupations. The top 20 occupations over the next decade, in terms of greatest opportunity, will not be high tech occupations. If you put together the high tech industries and the technology intensive industries, they total about 9 percent of the work force. So we have a very serious problem with our assumptions about employment opportunities that come out of high tech and some of the other issues involved with it.

It seems clear that the major problems associated with advanced technology and computerization are not scientific or technical, but human problems. There can be no doubt that we have the scientific and technological creativity to change the interaction between people and machines, or that we can change life forms, splice genes and create new forms. As we do it, we are learning a lot more about

human physiology, for example, that it is possible to live to be 120, or to change our working life span so that one can enter multiple careers at age 60 and 70. But people are still going to have to deal with the significant life events which shape these transitions in their lives, with values clarification, training and retraining, exploration and decision making, information processing, planning, and support and encouragement. These are the kinds of things which make the difference between being human and being an automaton.

The process of technological change throws a very long shadow. The effects are going to be dramatic, whether you are in a high tech occupation and depending upon the kind of subpopulation you find yourself in. In the future a major concern for young people will be how to access a rapidly changing occupational structure, how to shoot at a moving target. How do you explore or simulate or get information about occupations which occur in large buildings behind walls and fences? How do you get a handle on that? And how does that intensify under the implications of so much advanced technology and computerization? How do you explore? What about the people who are going to be in need of training and retraining? How do you identify those occupations for which retraining is likely to have some enduring quality? Retraining will become a very major issue. There is no question about it. The question is how computers will both force that and respond to it in terms of CAI and other kinds of instructional modes. What about so many of our minority groups members who have been clinging to economic advances over the last 20 years? Does this kind of advanced technology make them more vulnerable? One has to look at that kind of issue. What about our immigrant populations which are coming in to a very rapidly changing occupational structure? Can they learn the work habits? Can they learn the skills, or will they be left behind in the wake of a very rapidly changing socioeconomic structure?

This long shadow changes people's achievement motives, their feelings of ability to master the environment, their knowledge of the opportunities available. All of these elements get translated into anxieties, indecisiveness, stresses, and uncertainties and become the content which counselors need to deal with. They become the issues, the perceptions, the cognitive structures with which counselors have to respond and understand, because they are causative. The content is not static; it continues to change and, in a sense, to make people ambivalent about its costs. Some people think that the current recession from which we are emerging was purely economic, and that since we go through economic cycles you can wait it

out and go back to the same old job. If that is what you believe, you have real problems in terms of training and retraining, because even though opportunities in the smokestack industries will continue, they will be decreasing over the long term.

If you believe that we are going through a major structural transition, you have an opportunity to react differently. In many instances counselors are going to be the switching mechanisms by which people come to understand what we are really engaged in during this period. Within this context, the emotional aspects intensify because of the influence of rapid change and the diversity of educational and occupational structures. Other implications come forth that counselors need to address. What about the information needs related to emerging technologies? They are enormous. What is the need for math, science, and communications and computer literacy in the emerging structure of tomorrow? What do we mean by elasticity? What is elasticity and how does it work in terms of shifting from one set of occupations to another occupation? Does one constantly have to start over and learn a whole new set of skills? Apparently not--the data suggests that one has to learn about 15 percent new skills in order to adjust to advanced technologies, or to changing technologies in the advanced areas.

"How do counselors learn this kind of information? How do they think about helping people deal with entrepreneurial and cooperative behavior, not just competitive behavior? How do they think about new decentralized management systems? What does that mean? We have to guard against assuming, for example, that the world of work will suddenly be so totally different that we have no sense of it. We have to guard against what seems to happen so frequently in the popular press--we are going to wake up tomorrow and we won't know anything about the world. It won't look anything like today. That seems not to be true. If you look at a gene splicer, the fundamental knowledge base of gene splicers is still likely to be biological, anatomical or physiological. The fiber optics technician is still likely to be a physicist. The pollution engineer is still likely to have an engineering mentality. What you are likely to see, however, is a growing merger of intellectual disciplines so that increasingly we see biochemists, biophysicists and so forth.

On a personal level, we still have to deal with the fact that as we create economic requirements under advanced technology and the computerization of the occupational structure, both husband and wife have to work to exist. We have to realize that we are also creating new terminology like latchkey children, children

who come home and no parent is there. What does that mean about the values of the society? How do we deal with that? We have to realize that only 10 percent of working women have access to day care for their children. How do we deal with the fact that the rhythm of life, the 9 to 5 rhythm, can be changed dramatically under a computerization system which does not pay any attention to time, which you can operate from your home 24 hours a day? Is that a new cottage industry? What does that do with family rhythms, values and style? What does it do when we create images of excellence with only an intellectual emphasis? What does that mean for the slow learner? What does it mean for the mentally retarded individual? What does it mean for the disabled? What do we know about new levels of responsibilities and conceptual understandings of workers and knowledge requirements? How do we deal with those kinds of issues? How do we deal with the fact that as advanced technology impacts upon the occupational structure, more discretionary time will be available? We have come to learn that people often do not know how to deal with discretionary time, which is a mixed blessing. People used to think, "That gives me more time to drink beer and watch TV." It may be fun; perhaps most of us would like to have more time to drink beer and watch TV. The fact is, as a full diet, it does not work very well. People go look for another job, for something to occupy their time, because we have not educated ourselves to constructive leisure. And certainly those kinds of things and our computer responses are going to have to be addressed in the future.

Toffler's correlations of over-choice, future shock and stress-related diseases are clearly upon us as we look at what is happening in unemployment. We are increasingly finding ourselves in a situation where pluralism and heterogeneous lifestyles assault our consciousness about everybody's having a common meaning system, a common language system, a common values system. We talk about this great country of immigration, that we are not all the same, that pluralism does not mean we are the same people. We have different perceptions, we look through different lenses, we carry different traditions into this country, and somehow or another we have to be able to accommodate that. We have to accommodate the growing needs for bilingualism and multilingualism--these come along with immigration and with the movement of multinational corporate employees. Certainly we have to accommodate the fact that future careers will likely include not only vertical but horizontal movement in recognition of the need to provide increased opportunities for people to develop new skills and solve different problems, but not necessarily to advance in some competitive or vertical sense.

When we talk in these terms, we begin to ask new assessment questions. How do we deal with notions of complementarity and facilitative behavior, for example? Such questions throw a lot of our current perspectives askew. We come to the issue that when you talk about capital investment in high technology, it means that American workplaces are beginning to rediscover their employees. We are beginning to talk not only about personnel management, but also personnel development. That creates a whole new sense of how you deal with the worker as a person, how you deal with helping that worker develop as a person. We have come to learn from our experience with unemployment--which seems not to be a variant in our equation, given the 7-12 percent for the last 25 years—that when one commits oneself to work, one is committing a self.

Unemployment has clearly shown to us that when people lose their job, they are also likely to have early death. When people lose their job, the rises in stress-related disease are apparent. Instances of mental illness are apparent, as are those of child abuse, spouse abuse, and chemical dependence. We have come to know that unemployment is a process very much like the Kubler-Ross stages of bereavement, because it amounts to the same thing when people lose the self. We understand that one can also ascribe the notions of victimization to unemployment, and anger, repression and apathy. To think about unemployment in the wake of advanced technology is to recognize increasingly that the problems people bring to us are not unidimensional but multidimensional. We have to understand these problems in much fuller, more conceptual ways than we ever have. We have to realize that unemployment or underemployment is not an individual phenomenon, it is a family and social phenomenon. It is not just an economic but a psychological phenomenon. It is a cost-benefit problem for the society at large.

All these factors we have been discussing accelerate or increase the conditions for counseling. They are the kind of things which create an environment in which counselors are pivotal actors in a changing environment, a changing society. The questions are, "What are all the environments, the contexts, the settings, the populations in which counselors become terribly important actors?" Within these environments, computers and advanced technology are not just the causes to which counselors must respond, they also represent the tools. They represent the devices, the instrumentalities by which counselors can discharge a lot of their responsibilities more effectively.

On the last issue of computer as method, I think that although many of the questions about advanced technology are theoretical and abstract in nature, the impact of computers on the profession of counseling is no longer an abstraction. It is a tool. It is a form of technology that must fit in some relative sense within a conception of program, within some formulation of goals, within some pattern of methodology, and in doing so it brings us back to the metaphors that we talked about before. As I have suggested, many metaphors have explicitly or implicitly been applied to explain the potential or actual effects of computers and related technology on personal and career development. The mind multiplier as a metaphor for compounding the visions, risks and investments which people can simulate and play out becomes a terribly important device or tool to extend the counselor's capability. Obviously, the computer is forecaster, the computer is organizer of time, the computer is scheduler, the computer is information retrieval. Each of these metaphors has redefined the content, the time spectrum, and the characteristics of the intervention strategies which are appropriate to influencing the personal and career development of different groups of people. Although many of the uses of personal and career development are still promises, not actualities, they have required that counselors increasingly become technologists, that they understand this tool in ways which extend their concepts of gaming, and that they become applied scientists in many ways.

Boom or boomerang? I don't know the answer to that. It is a values issue. I hope as you go forth, as you affect counselor training, as you affect program thinking, that you continue to think not only about the instrumentality but the values, the ethics, the conceptual dimensions which all of us are on the threshold of trying to address.

COMPUTER USE OR ABUSE:
ETHICS IN THE USE OF COMPUTERS

James P. Sampson, Jr.

If we want to look at computers, we could begin by first examining the professional literature. (That is a novel idea--I think people should read journal articles once or twice in their career. It makes us feel good as faculty members to think that someone actually would read our articles!) The first assumption we all have in talking about computers is that computer applications are more effective in repetitive data collection, processing and dissemination tasks, as well as in repetitive instructional functions. Computers are better at processing data, essentially.

The second assumption is that as a result of computer technology counselors will spend a greater percentage of their time engaged in more complex, higher-order interactions, such as helping clients process the multitude of personal and environmental factors that support and inhibit behavior change. We take a part of the counseling process that is not very efficient, like dealing with information, and we let the computer do that, thus freeing up the counselor to do what we say we really want to do, which is to counsel people.

There is quite a bit of evidence in the literature that says the first assumption is correct. In fact, computers are a lot better at dealing with information processing tasks. One of my favorite illustrations of this is the Occupational Outlook Handbook. Can anyone tell me what is on page 200, third paragraph, second sentence? Obviously that is something most of us do not have stuck in our heads, but it is a very easy thing for a computer to do, to feed back what is on a particular page. The idea here is to let computers do what computers do best and let humans do what humans do best.

In regard to the second assumption, we have almost no data saying that as a result of computers counselors are really more effective, move farther, go faster, or deal with more indepth and important issues that they never had the time to get to because they spent all their time with data processing tasks. In fact, if we take a look at the research, what we see is that there are some types of counselor intervention with most computer applications, but the intervention is never

described very carefully. Most of the articles talk about what the software does, but very little about what the counselor does--we have not been very careful about describing exactly how counselors are supposed to help clients.

Because of this, an environment exists where inappropriate use of computer technology is encouraged. The lack of research data regarding counselor identity and behavior does not help us in training new counselors in knowing how to use all the technology that is now available. Because we have not been very careful in specifying exactly what the counselor is supposed to do, and because we have not been clear on how to help counselors help people to use this technology, we are, in essence, inviting trouble for ourselves.

The presentation earlier this afternoon on how to use computers in group counseling is a very important step in solving this problem, but few conference presentations are provided on this topic. Most presenters talk about the nature of new software programs, but very little about how to use them in a counseling sense. Well, there are two possible outcomes as a result. One is that we will not be able to help our clients get the best possible benefits from the technology--they will use it, but they won't exploit its real potential. The other and far more damaging outcome is that the use of these computers will actually harm people. It will do exactly the opposite of what we intend and hurt the clients whom we are trying to serve.

In terms of the potential for negative impact by computer technology, there are three things that I want to discuss: misuse of technology, excessive dependence on technology, and restriction of the counseling process. In regard to misuse I am not really talking about confidentiality issues, although I think those are very important, but rather the problems involved with counselor behavior and identity.

Probably the one area of computer technology where the most concern has been raised is computer-assisted testing and assessment, or what is called CBTI, which stands for computer-based test interpretation. In the past we have had a natural protection against misuse of tests because many of them are rather complicated and it takes a while to learn how to use them. For instance, think of the MMPI and the standard scoring profile sheet. It has very few words; it has some little boxes, places to put the scores, and down at the bottom letters and numbers--L, F, K, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 0, etc.--with a couple of letters underneath that. Now, if you give that to an untrained person and say, "Would you interpret this data?" the reply will likely be, "I can't say anything about that." But, with the

power of computer-based test interpretation, those validity scales on the MMPI are now summarized in an interpretive report that says whether or not the test is valid. All of a sudden, scores 1, 2, 3 and high-point codes and everything else are all explained in the interpretive report.

The problem we run into here is that these computer systems have been designed with two assumptions--that the user is trained both in the contruct being measured, i.e., personality, and in the specific characteristics of the instrument. Well, now we have someone who has never had a course in abnormal psychology or the MMPI, but with the advent of modern technology and computers, we no longer need to have these courses--isn't that "wonderful" how we've been able to make progress?! Because it is all explained to you there: you give a person the MMPI, look at the results, and then interpret those to the particular client. But these people are either unqualified because they lack training and background in assessment, or unsophisticated because perhaps they have had some training in assessment but not in personality assessment.

We can get into a lot of trouble with this. I think, in one sense, counselors may inadvertently use computers to compensate for their inadequacies. They can say, "Well, I'm not very good at this. I would have never done this in my private practice before, but now I feel I can because the computer makes up for my deficiencies." The software was never designed to be used in this way, however, and I think we will end up with some substandard professional practice. I don't think you can take a computer-based test interpretation and fully understand it, unless you know something about abnormal psychology--if you don't know something about schizophrenia, then trying to interpret a score on the MMPI is potentially very damaging.

Another problem with misuse involves inappropriate access to computer applications. This involves the question of how much counselor intervention is necessary for these systems. Do we allow students to use a computer application without prescreening them first? Imagine someone who has dyslexia, sits down in front of a computer and tries to use a program. How frustrating that must be when all the words are jumbled up on the screen. Or how many adult clients come in and say, "By the way, I'd like to start off by telling you that I read at the second grade level and I need a lot of help in order to be able to take advantage of your services." Most will come in and attempt to use the service, will try something, become frustrated, and say, "Well, you know, I have to pick up my daughter, and I

need to go." They are out the door and probably never come back. One of the reasons, despite these sophisticated services we have provided, was they could not read what was on the screen. But they are unable to say so, because of their own self-concept, "I can't read that, I'm embarrassed, and I need to ask for help." So, if we don't prescreen people to determine which individuals can really take advantage of this technology, then I think we end up causing some problems.

Another problem is misconceptions--people believe that computers are the answer. Human beings are still smarter than computers at this particular point in time, but people believe computers have some infallible wisdom that they are going to impart to us. If we don't use computers in a counseling context, then sometimes people take these examples and answers and think they have found the gospel.

Another issue involves the use of computer software outside any counseling context whatsoever. We have talked a lot about networking, teleconferencing and electronic mail; about how good they are. If some of these very sophisticated counseling software programs are put on an electronic network, you can get a kind of psychotherapy over the phone lines into your computer. But what happens if you have inaccurately diagnosed yourself? It's like treating ourselves with patent medicines--sometimes we get in trouble.

What if you are not able to use that software effectively? The software really is not clear sometimes about how to use it. If you try and fail, you might end up saying, "I'm incurable. I can't be helped." That, of course, will not encourage you to go out and seek any other assistance for your problem. And how many clients, by the way, have only one problem? One unitary, isolated problem? Haven't we learned from family systems theory about how interconnected problems are? When you use a computer that espouses one cure for a particular problem, you fix one aspect and then another person in the family begins to act out or something else pops up. Our problems tend to move around when we have not dealt with some of the underlying basic issues.

Another concern involves the availability of computer applications, for example, in the public library, shopping malls, or employment settings where no counseling intervention is available. One proposal has been to set up a storefront operation with counseling software inside instead of video games. You come in with a huge bag of quarters; a person is there with a big change belt, obviously to give you quarters, and you just keep feeding the machines, getting occupational information, or ideas on stress management, or ways to improve sexual

compatibility with your spouse. Are these systems really effective when they are used outside any counseling context whatsoever?

We know that computer-assisted instruction is most effective in the context of a regular instructional process. A lot of data exists saying that students learn best with computer-assisted instruction when it is used outside the classroom and when they go back to the classroom and talk about what they learned on the computer. When students take an entire course on the computer, there is no instructor. They register, show up for the first day, get a computer account, complete all ten modules, and then get three hours worth of credit. But people do not seem to learn as well in that situation, and I think the same is true of counseling. We have some research data that I think supports this, that says people get more out of the experience of using computers when a counselor is present.

Another issue in the area of misuse involves dependence on computer technology. How many of us are dependent upon an automobile? Almost all of us are, for one reason or another, and we accept it as one of the prices to pay for living in a technological, modern society. But as counselors are we going to be dependent upon computers to the point where it is no longer just an asset, extension or enhancement of our work, but a necessary part of it? This becomes an issue when we talk about expert systems, which involve rational decision-making as well as expert information. In essence, you use the expert system as a consultant. You solve a problem yourself and then go to a computer to see if the computer gets the same kind of answer.

In mental health settings, for example, it is possible to have an interactive computer system with expert knowledge from many people experienced in diagnosis and treatment planning. The system asks such questions as, "What was the client's presenting problem?" "What did they talk about?" "What was their emotional condition?" As you keep on answering these questions, the computer says, "Well, there seems to be a high likelihood of this being the case, and maybe this, or this also could be happening with this particular client." Well, this is really helpful when you use it as a second opinion. But let's reverse the situation, where the counselor is using the computer to compensate for professional inadequacies. You see, when I have a client, the first thing I do when we have finished talking is go to the computer and see what the diagnosis is. See how I have short-circuited the original process? Instead of relying on or upgrading my own abilities of diagnosis and treatment planning, all of a sudden I become very dependent on the computer to do my thinking for me.

Well, these systems were never designed to be used this way. A computer is incapable of integrating all those unique characteristics of a client's history, personality and environment, or of matching client needs and service options with the capacity of a human therapist. The computer is simply not smart enough to do that right now. Expert systems are improving all the time, but one of the things we have learned about expert systems is that in 1986 we are nowhere near where we thought we would be in 1960 when we predicted a lot of big changes. We have not made as much progress as we thought because I believe we are smarter than we thought. What it takes to make a decision is more complex than we thought back in 1960 when we had great expectations about how expert systems were going to change the face of professions.

What happens to the counselor in all of this? As we become more dependent on the computer, how are we going to feel about ourselves as counselors? What happens to our self-concept as counselors when we realize that our expertise is slowly beginning to slip away? "I used to be pretty good, but then the disk drive broke yesterday on the computer and I had to take a sick day because I was scared that I couldn't do my job." Many people would quit or become burned out in a situation like that. Although I am a proponent of expert systems and I want to see them develop, they are only a second opinion that you use to clarify what you may have decided was going on with a particular client. When we reverse that, we have a high potential for damage.

Restriction of the counseling process is another significant issue in dealing with computers. Basically, a computer is a mathematical entity; it deals with verbal symbols by converting them to mathematical relationships. I think we could all agree that the computer is essentially a cognitive process, but counseling is not all cognitive--it has very important affective and non-verbal components. Computers cannot notice when someone is sad or scared, or when a non-verbal behavior is completely incongruent with what is being said. If we let people have access to computers without access to counselors, this over-cognitive emphasis may not only restrict but also dehumanize the counseling process. A computer is nothing more than a tool, but we can be dehumanized by the way we use computers if we allow the over-cognitive emphasis to pervade the way we do our work.

Another issue involves client expectations for rapid behavior change. Just pick up any of the popular media and they say computers are working faster and can store more data, that we can do more and more, faster and faster. People want

immediate answers and quick change. Are we going to make clients think that we can speed up the counseling process by using computers? Actually, it is my opinion that we use computers too fast. When a person goes through a program like SIGI or DISCOVER, for instance, or CHOICES or CIS or any of the career systems that we have, they often start at the beginning and bang right through to get an answer at the end. But there has not been enough time to sit down and think about what happened, what their values are, what their skills are, what they think about the occupations on their list. Our society is moving so fast we do not have time to integrate what is happening in the counseling process, and I think computers may actually make that worse. I also think this speeded up process becomes more damaging when people use computers without a counselor to mediate, to help them understand, to say, "Now wait a minute, slow down. I know you want to get an answer but take some time to think about this."

How has all this happened--why do we have these three problems--misuse of computer applications, dependence on computer technology, and restriction of the counseling process? I think the reason is that technology has changed so rapidly we have not been able to keep up with it well enough. The changes have occurred so quickly that we have not had time to absorb and think about what is going on. We do not have enough time to make use of the computer applications we have now, much less to invent new ones. Remember, too, how many years it took measurement to evolve a series of standards about validity and reliability? We had time to figure it out, even to make a lot of mistakes. But computers have hit us fast and hard, and we haven't had time to think about how to use them effectively.

Another problem is that we are operating without theory--there is little theoretical basis for how you integrate computers in counseling. I am working on this problem, but I am nowhere near close and no one else I know has developed a well-formulated defensible theory on the best way to use computers in counseling.

So what we need, I think, are two things, two solutions for this. One, we need more research and more professional standards to help guide our use of this technology. We need research because we really do not fully know what we are doing. We know a lot about the software, but most of the research has focused on the performance of the software and not the performance of the counselor. We do not know what counselors do with time they have left over. Are counselors seeing more clients as a result of computers? Are counselors spending more time with clients who are using computers? Do counselors talk about anything differently

with a client when they have used a computer? We have some anecdotal evidence about each of these things, but no well-controlled research. What kind of impact does sex have on using computer interventions? There has been some talk that computers were introduced to children through games of violence and that, as a result, young girls in school tend not to like computers. There may be a gender-related problem in regard to using computers, that women may not be as willing to use computers as men are.

In terms of minorities and multi-cultural aspects, we also do not know much about what is happening. What counselor intervention strategies are most helpful? What exactly does a counselor need to do to help a person use a computer? Can computers, in fact, introduce clients to the most effective use of computers? I don't know. How do we follow up the use of a computer intervention? What are the things we say to someone after using the computer intervention? How do we prescreen people? How do we know whether a person can really make appropriate use of the system?

Another question is what happens to counselors who use computers, who begin using expert systems regularly for diagnosis and treatment planning? Does that have any impact on the way counselors think about themselves? Do they, in fact, feel they have got a good consultant in the computer, from whom they can get a second opinion and really learn more? One of the ideas about expert systems is that it is an excellent teaching device because when an expert system comes up with a diagnosis different from what you thought and you ask, "Why?" it says, "Well, first you said this, and then you said this, and this data from this study shows it really works best when you try this." The idea is that you really learn something in this process.

Does that actually happen when counselors use expert systems for diagnosis and treatment planning? Or do counselors, in fact, feel weakened by the process of using the computer? I think there is clearly a lot of research that needs to be done.

Another priority involves the development of professional standards. The American Psychological Association has come out with a document called, "Guidelines for Computer-Based Test and Interpretations," that deals with the best use of CBTI programs. AACD is currently revising its ethical code, which will include some comments about computer applications.

One of the issues I have struggled with here is, how much is an appropriate restriction or guideline? Some people have said that if you restrict the use of counseling software, then users will get information from other sources. Being too restrictive hurts system developers who are trying to be innovators, and much as I have been critical of software, we have to admire and support people in developing new and innovative uses of software. On the other hand, we also have to be careful about how the software gets used. So we develop standards. Do we say that you have to have an NBCC certificate in order to purchase certain kinds of software? Do we say there is only an exclusive group of people who can use these counseling programs? Or do we have a laissez faire attitude and say anybody can use the software? I am not certain we know right now how restrictive our standards should be. In workshop sessions like this, or at AACD, if we make people more aware of some of these issues and begin to evolve standards on the importance of counselor intervention, or the importance of correctly using CBTI programs, then maybe we are making progress.

We need a group of innovators out in the forefront looking at how to find new technology and new ways of delivering services. But we also need other people in the background to say, "Now, wait a minute. How are these being used?" and "Do you really have a good manual for that software? Does the manual describe the basis upon which that software was developed? Does the manual describe the validity and reliability of the software? Does the manual provide suggestions on how to use the software with various kinds of clients? Are you sure there's no sexual, racial or ethnic bias in the way that software was written?" All these are important questions that we have to ask. We need someone who is holding back and saying, "Now, wait a minute. I'm not going to buy that software until the manual is a little more complete on whether or not this thing really works." If we, as consumers of software, say that to publishers often enough, they will in fact change their behavior. So what we need is a balance of innovators who are willing to take us farther than we have been before, and other people who will hang back and say, "Well, now wait a minute. Let's think carefully about what it is we're doing and the implications of our use of computer technology in counseling."

COUNSELORS VS. COMPUTERS: A COST/BENEFIT ANALYSIS

Marilyn E. Maze

Recently I tried to explain to my grandparents what I do--that I use computers to help people plan their careers. First, they are not sure what computers are. They have seen computers on television but have never touched one. Second, they cannot understand why anybody would want to use one of those machines for helping people with career planning. Everybody knows that you just go out and get a job. If you don't like it, you get a different one, and when you find one that sticks, that's your career. Right?

I would like to begin with a bit of my own history. I graduated from college with a math degree and a teaching certificate, but I had been in school all my life and wanted to experience a different setting. Luckily, that was in the golden years of computers when I could easily get a job as a programmer. My first day on the job I was handed a Fortran manual and given a little problem. My boss said, "Do this on the computer and show me the results and then I'll give you a real problem." Within a year I had written programs that were really useful and were helping the people at that company. I was writing instruction manuals for use with my programs and giving training seminars for engineers. That was pretty heady stuff for a kid just out of school. It was a great job.

The only trouble was that I kept dreaming about computer problems in my sleep. I decided that there was another part of life that had been cut off by my intense interaction with technology. I returned to teaching math. I found that I had to work very hard just to get people to listen to me. I wanted to help people with the problems that they were interested in solving, so I became a counselor. Sure enough, people came to talk to me by the droves. They were very happy to talk with me about their personal problems, but I found out that I could never do enough and I always felt behind.

I went back into the field of computers after a few years and started developing tools for counselors. Now I think I have finally found a place where I feel a lot of satisfaction. I can give counselors a computer program that makes their job easier and is really valuable to their clients. The clients thank the counselor, making the counselor feel good, and the counselor thanks me. The

combination of these experiences has made me believe in what technology can do for counseling.

I would like to describe the costs in developing a computer program. Let's say that you want to design a new computer program. First you need to get paid for doing the design. Two months would be needed for the very simplest kind of program, and one year would be needed for something fairly elaborate and complicated that would simulate counseling. Counseling functions are actually very hard for computers to perform—and programs that simulate counseling are very difficult to write.

Next, you need to hire a programmer. It would take that person a minimum of four months to do the programming. I am assuming that you want the program to work on two types of computers, an Apple and an IBM. Programmers may tell you they can finish in a week or a month, but before you get a program that works properly, it will take a minimum of four months and probably much longer. I have been working on one now for two years which I believe will be finished within a year.

Let's also say you need labor market information in the program. If you are going to write a career planning program, for example, you will define a list of questions and need an analyst to find the right answers for a large set of occupations. Then someone has to type the data into the computer. You also need computers on which to do the typing and programming. I assumed you are going to buy an Apple and an IBM, but you may need two or three of each if you have more than one programmer working at one time. The costs look approximately like this:

	Simple Program	Complex System
Designer @ $5,250/mo.	$10,500	$ 63,400
Programmers @ $3,500/mo.	14,000	127,000
Analyst @ $1,750/mo.	3,500	21,000
Data Entry @ $900/mo.	450	1,800
Hardware	4,000	20,000
	$28,500	$233,200

Note: Consultants' salaries allow for health, vacation, and sick leave benefits.

The minimum figure is based on writing a program that does not require a labor market analyst, that only requires designing, programming and hardware. The maximum is based on a more complex program using all of these elements.

Let's look at the competition. The Directory of Microcomputer Software for Counseling and Guidance is produced by the Santa Clara County Office of Education. Using this directory to count the programs, I found 13 career planning systems. If I wanted to design a whole system, I would be competing with them. If I wanted to write a short career exploration program which would sell for about $200, I would be competing with 29 other programs. If I wanted to do something in the "job search skills" area, I would find 21 programs in competition with mine, and 14 if I am doing something on "job keeping skills."

How large is the market? Let's assume there are approximately 15,000 public and private high schools and there are approximately 3,200 public and private four-year colleges. How many of those high schools have computers that are available to guidance? I am guessing about 50 percent. Small schools may not have any and large schools may have more than one. That would cut the high school market to 7,500. Let's assume 75 percent (2,400) of the colleges have computers for guidance. I am assuming that two- and four-year colleges have more money for computers.

If I wanted to write a little program that would not require labor market data (for example, job search skills), my expenses would be designing it, having a programmer write it, packaging it, and trying to get someone to sell it for me. Assuming the program is going to appeal both to high school students and to college students--a big assumption because this is rare--I would hope to sell 471, assuming there are 21 now and I am going to capture an equal share of the market. Next I need to take the other costs into account. Once I go into production, I will allow at least 10 percent of the retail price for the materials. Twenty percent is a moderate figure for overhead and support, including the person who packages it and mails it, the person who answers the telephone and a technical person who can help users who can't get the program to work on their computers. For marketing, figure 40 percent and for profit about 10 percent. In total, this means that 80 percent of the cost of the product is tied up in things other than development. This leaves only 20 percent for the developmental costs and we already know those are $28,500. If you do some reverse calculations, you will find out that you need to charge $303.

If you have looked in the catalogs, you know that the costs are usually between $100 and $200. The developers optimistically think they are each going to capture more than their market share. Most of us believe that our program is the

best and everyone will buy it, so we set the price a little lower. Prices could be higher if we were going to be practical business people and try to price our products based on our costs. Competition is rather fierce in this field.

Let's say I want to design a large program. I may try to get the funding and support of some major organization or talk a group of investors into giving me money to do a really good system—a career planning program or a counseling program that combines a number of different functions into one package which frees the counselor from supervising the client at the computer. The program, again, is going to appeal to both high schools and colleges. My market share then, based on the number of systems already available now, would be 762 over the life of the product. The production cost will include 10 percent for materials, 20 percent for overhead, and 50 percent for marketing and service, since this kind of program requires a lot more service. The service staff must go to the site to demonstrate it, then return to train site staff in using it. We still have to allow 10 percent for profit. This pushes our development costs down to only 10 percent. We need to recover $3,060 per site for this kind of a program.

This gives you some ballpark numbers from the developers' perspective. It sounds exciting to design a program, but the cost figures are not that exciting for developers. You may notice that my cost figures are higher than the prices currently being charged. This indicates that the prices are justified and counselors are not being cheated when they pay $200 to $2,000 for software.

Let's look at its value to you. First of all, what are my assumptions? Let's assume a high school or college setting where there is either a teacher or counselor working with 25 people at a time. Also assume that person is paid between $20,000 and $40,000 a year. Based on the typical school year, assume 1,200 contact hours. The professional's time is then worth $.68 to $1.32 per student per hour.

Let's assume further that students need to learn how to write a resume. Assume they can learn how to write a resume in one day (to keep the costs down). How many students would you have to run through a computer program instead of a class to make the program worth your while to purchase? Let's assume the program does the resume writing and teaches the same skills the teacher does. You would have to run between 75 and 150 students through to justify a cost of $100. That's not very many; most schools will use a program with that number of students the first semester. Over the life of the software, it is dealing with students very efficiently, saving time and money.

There is a catch--you already have the teachers and you are not really displacing them when you buy the program. The software provides an additional service at an additional cost. With the software, you are providing a service to the students who missed the class or who took the class and still missed it. It is efficient for a teacher to deal with 25 or 30 students at one time. The ones with special needs, who want just a little extra help for one reason or another, are the ones who need the computer software most. Is it worth $100 to reach the students who are not being reached in the traditional classroom setting?

Let's look at a career exploration program that asks several questions and then gives clients occupational suggestions. Let's say it costs about $200, and it replaces a test that costs between $.65 and $10.00. Based on this cost range, the breakeven point for a $200 program will be between 18 and 150 students. You can see that the computer software is cost effective and will save you money in the long run. The catch here, of course, is that you may not now be using tests, so that the computer software may be an added cost, but it is less expensive than adding a paper-and-pencil test to your program.

Let's look at career planning systems. A system that does several different functions could be equivalent to five days of teacher time and cost $2,000 per year. Assume the information and assessment exercises in the system are equivalent to $5.00 worth of materials per student. The breakeven point is then between 170 and 240 students. Schools that use the program with this number of students in one year will find those programs are cost effective.

These programs do not intend to replace a counselor with a computer. My experience is that the computers are often used to supplement what counselors have been doing. Computers provide services that counselors were not doing as well as they would have liked. Computers are taking away the feeling I used to have when I was a counselor that I just could not meet the demands. It felt, especially when I was working in a high school, that there were too many people who needed personal attention. I was spending much of my time on the students who were having trouble. I didn't have time for these students who needed advising and who needed to make sure that they had the right classes to get into the college of their choice. It is my hope that the computer will meet a lot of the basic student needs that are difficult to meet with the high student/counselor ratios which are common in the United States.

It is important to give students individual attention. An earlier assumption was that 25 students were sitting in a classroom. Compare that experience to one person sitting down alone at a computer. The computer experience is often more rewarding because students feel they are receiving something special and personal. The computer can give the kind of individual attention to the student, the kind of quality attention that counselors may not be able to give to everyone.

Another advantage of computerized guidance is instant scoring and feedback. Scoring paper-and-pencil inventories takes time. It's much more fun when the computer spits the answers out immediately. The computer can also explain what the results mean. The computer process comes close to what a counselor would be doing in an individual interpretation session. The final step is for the client to bring the printout to the counselor to make sure the client understands the results. The client has already read the report and can ask the counselor, "What is it saying about me?" The counselor can help the client make the necessary connections without needing to repeat the basic explanation for each client.

In addition, the computer provides a personal copy for each client. Clients walk away from the computer with their own individualized record of the interaction. This is very rewarding for the client.

It is confidential. Clients use the computer by themselves. Clients have a sense of privacy, of being able to say almost anything they want.

Finally, the information is accurate and more up-to-date than in most books. One of the things you can insist on in software is that it is updated on a regular basis so that the information is as accurate as it possibly can be.

These are some of the rewards that I have observed in using software. Now, let's look at one more cost--the program of your choice doesn't run on the computer(s) that you already have. Here are a few suggestions for controlling hardware costs.

First of all, decide which software you want, and then find out what hardware you need to work with it. Some people call me up and say, "I've got an Apple. What runs on an Apple?" That approach limits the kind of software you can use. Most programs do run on Apples and IBM PCs. If, however, you look at the more sophisticated software, you will find that it requires a hardware setup designed specifically for that piece of software. So you need to think first about what you really want to do in your counseling center, then buy the hardware to match.

Some technical advisors express opinions like, "Don't buy an Apple. Apple Corporation is going out of business." Then you start worrying, "Oh no, what if I buy the wrong computer?" In counseling and guidance, computers do not become obsolete as quickly as in other fields. Software developers are aware that quite often the business department or the computer science department passes its older computers down to the guidance office. The developers will maintain those versions of the program that run on the older computers as long as they have a minimum number of customers. If you purchase a program that runs on the hardware you already have in your school, you can count on using that piece of software and having it updated on a regular basis for at least three years—that's a long time in the area of computer software.

The cost of storage devices is declining rapidly. That is wonderful news for counselors. You can now buy a 20-megabyte hard disk for $400. The same hard disk used to cost $4,000. It's fun to watch the prices go down. About four years ago a computer with a hard disk cost about $10,000 and few sites had one. Two years ago the same computer cost about $4,000. This year I bought one for $1,700, and prices are dropping again. The new computers are faster, have more memory, and the hard disk has more space on it.

Many computerized guidance programs are copy protected. A set of software is intended to be used on one computer only. There is a common belief in education that copying is justified for teachers. Those of us who develop software believe we have to protect our programs. If counselors start telling us, "I wouldn't copy it. I understand your point of view," then the protection will relax. But right now, you usually need to purchase one set of software per computer. In California we frequently see whole computer labs (30 computers) all running the same program, and an entire class uses the program at one time. With current pricing policies, that can be very expensive.

It may be possible to cut costs by sharing resources. For example, several computers may be able to share a hard disk instead of purchasing one for each computer.

Finally, of course, find a local source for technical support. Students may be able to help with things you find difficult. Counseling software tends to be updated every year, and each update can be traumatic. Updating may take a lot of button pushing and some technical expertise. If you can find someone locally who can help, you may feel more comfortable with the computer.

I hope that as computers become more common, we are all going to become good consumers. I hope most counselors will be able to tell the difference between good software and bad software. I think a lot more responsibility will be placed on the counselor in terms of choosing software. A course in testing is part of most counselor training programs. Counselors need similar training in guidance software. If the software is not appropriate for your students, if it is not giving your student the kind of help you believe your students should get, you should send it back. It is up to you to make that decision and to demand quality in the software that you provide to your clients.

TAKING THE BYTE OUT OF COMPUTERS: STRATEGIES FOR MINIMIZING STRESS

Joseph Fisher

Let's talk a little about computers. I know very little, frankly, about computers although I have had a lot of experience with them in my former company, Human Synergistics, Inc. I understand the nature of computers, how powerful and accurate, and how challenging and perfectionistic they really are. They are awesome when you face them for the first time. It is fascinating to me that people who try to use a software program to become better managers, administrators, or supervisors have a terrible problem with facing what that little piece of software can tell them on the hardware, whether it is a mini-computer or any other. I think that is one of the inhibitions that we all face with new technology, with changes or things that we really do not understand. So I would like to talk a little about the stress that comes from facing new challenges, from facing the unknown.

Whether you are a professional trying to understand computers as they apply to your own practice or an administrator trying to establish computers in the system you are part of, I think that the remarks I have to offer can apply to either setting. Some of you may say that the topic of stress is not too relevant, that you do not have much stress. Some of you, I would then suggest, may be carriers--you very likely are transmitting some stress to those about you. I would also suggest that stress and change and growth and newness are very good for you. Hans Selye talked about two kinds of stress. There are eustress, or positive stress, and distress, which is what we usually think of as stress. I would like to break that down for you just a little to clarify what I intend to talk about, which are the seven "C's" of stress.

Let me explain stress as a notion that has to do with thinking, with the perception that we hold of a situation. We make certain assumptions about computers, for example--that they are powerful, that they are quick, that they do things far beyond human capacity. And that's true. But I suggest they do not do things that human beings do, like feel and think. Some will argue with that, especially proponents of artificial intelligence, but I think the name tells you

something--it is artificial, not human. To try to be computer-like is one of our problems and we have to examine sometimes the assumptions underlying our views or expectations, in order to cope effectively with the changes involved with understanding, adopting and mastering new technology.

Our minds are makers of meaning. We have powerful capabilities between our ears. In fact, the computer is a model of the mind as we understand it, and this computer we have between our ears is by far the most powerful, awesome experience. Just to understand the nature of it--God made a computer that each of us has that I think is far beyond anything purely analytical. Because the right hemisphere of our brain, for example, does a whole lot more for us than just add up the facts. It helps us intuit and see into situations, helps us feel and understand so much about change and about computers themselves that no computer, I believe, will ever have that kind of capacity.

The process of stress is one of adaption, of adapting. In fact, Hans Selye talked about this model, the GAS, the General Adaptation Syndrome. When we're anticipating something that is strange and unusual, something that we do not quite understand, I suggest, with Selye's model here, that we go through stages. When we anticipate having to deal with something unfamiliar, there is a kind of alarm reaction, "Oh my god, can I handle this? I'm not so sure." Once we have that kind of alarm go off, we move to a state of resistance and try to cope with it: "Well, it's no big deal. I can do that if they can, and I'll just get in there and play with it tomorrow when I'm comfortable with it."

As we go through stages of resisting and coming to grips with what we are trying to understand, the very act of resisting sometimes can lead to a stage of exhaustion. With something dramatic or major in one's life, like a divorce, these stages become more real, even awesome in their potential. Once we realize something is wrong or not working, we start coping through all kinds of denial, all kinds of resistance to the idea that it is going to happen to me. That is what often leads us to the stage of exhaustion in the end.

But what is stress, exactly? Let me use two definitions. Hans Selye says that stress is the non-specific response of the body to any demand placed on it, non-specific meaning that each of us may respond to stressful situations, whether it is technology or changes in the environment or whatever, in our own unique and special way. It is that uniqueness about us as human beings that I do not think we can ever quite program. Each of us has, in Selye's definition again, a kind of weak

link. Some of us may get a little depressed or feel a little helpless under conditions of change. Others may get excited and try to do something more aggressive. But each of us has our own weak link and that specific or non-specific response is what makes us uniquely human. The other notion, which I think is more practical in a lot of ways, is that stress is the perception of threat and the process we go through in adapting to it. As I said earlier, stress can be positive and negative. Positive stress is called eustress. Those are the things that can excite, challenge, encourage and intrigue us. Negative stress, which we usually consider distress, is what irritates, frustrates, discourages, angers, makes us anxious or afraid.

Now, where does this stress come from? Three primary sources: our genetic predisposition, which you can't do a whole lot about; our current environment; and our own thinking. What we think, how we interact with those two variables, influences the kind of stress that we, in fact, experience.

Let's look at some of the stresses in our lives for a minute. There are all kinds, and influences from the environment are infinite. We each have a set of filters through which we understand our own reality and perceive the changes going on around us, particularly high tech changes. For each of these changes, we make meanings because of our own self-image, our level of self-esteem, and of course simply the picture in our mind's eye of who we are as a human being. If we see changes ahead, if we can anticipate them and assume that everything will work out well, even though it might be difficult, chances are the outcome will be a positive experience. If we are afraid, if we assume that no matter what we do, another disaster is in the making, the chances are we will make it so--it will have a lot to do with the actual outcome.

I would like to make one more point about stress before talking about the "seven C's," and that concerns the two basic stress theories. Holmes and Rahe refer to life events as bringing about a great deal of stress. This has to do with adaptation because the adaptation to change, the adaptation to threat, the adaptation to newness involves the kind of thinking that can cause us burnout. They suggest, for example, that if we have too many life events in too short a period that add up to about 350 points (in their way of adding up points), we can literally make ourselves sick, to the extent that we have to be hospitalized. I propose another way of looking at stress and change, and that has to do with what we think about those life events, about those changes, and what we assume about ourselves and our ability to cope with and deal with them.

Now let's talk about the seven C's. Change itself--a disease of adaptation. Alvin Toffler in both of his books, Future Shock and The Third Wave, talked about the exponential rate of change. If there is anything that speeds up and brings along this exponential rate of change, it is the subject of this conference, because computers can enable us to accomplish things so far beyond human capability that we cannot imagine yet what the limits of computers are. As the micro chips get smaller and more powerful, the rate of change continues to accelerate. Understanding our ability to cope with that, and accepting our responsibility to cope with that, is part of the challenge that faces us. But I think we have the capability to do things way beyond our imagination at this point if we are able to collaborate and work together in bringing about those changes. So change itself is a powerful notion as it relates to dealing with stress.

Control is the second C. One of the ideas that I like to use is the notion of the pilot. If we talk about control in our lives, what we have to keep in mind is being the pilot and not a passenger. If you are bringing about change within your own life, in your career, in your school system or in your personal professional practice, I think it is extremely important to accept responsibility for the control that is necessary to bring about that change. If you do not feel in control, the chances are the stress will be something that can be terribly negative and will be distressful and obviously not eustressful. A good example from my past clinical work would be people going through a divorce--the individual anticipating the divorce versus the one initiating it. Probably, the stress is much higher under the condition of anticipating the divorce than initiating it. Again, the idea of control--if we feel in control, we are able to manage and cope with a great deal of change compared to what we might do otherwise.

Choice--there is always a choice. When we exercise our choices, it makes a difference in whether we feel distress in a situation or regard it more or less as a challenge and an opportunity for growth. Let me share with you the model that I have been working with over the last 15 years in my consulting practice. What the environment brings us in terms of events and changes is a powerful influence, but our thoughts, the attitude that we take toward a particular change, make a tremendous difference in the kind of response we are likely to have out of it--whether it is a positive experience, that is, if you look at it rationally. If it is something difficult, something I am unfamiliar with but can and will do, then I will pay the price to get myself ready; chances are it will be a highly eustressful or

positive experience. If I make the assumption this is too big for me, this is too tough, or my effort will not make a difference, it will probably turn out to be a pretty negative or distressful experience. I think what is critical under conditions like that is to reexamine and get in touch with your own thinking, because sometimes just changing an assumption, a point of view or an attitude--and here's where counseling makes a difference--can help you see what might really be possible.

Communications is the fourth C. In his book, The Language of the Heart, Dr. James Lynch talks a lot about feelings and about Type A personalities who cannot feel their feelings. They have feelings but tend to suppress them, pushing them into the cardiovascular system and allowing the body in its wisdom to maintain the stress. That is what hypertension and high blood pressure often come from--denying your feelings, not experiencing feelings for what they are. I think having feelings and experiencing feelings is part of what keeps us healthy.

Another of Lynch's ideas is the "effect of person," or the ability to influence one another by our attitude and approach. This can make a powerful difference in the amount of stress for a person who, for example, is trying to master change and deal with something unfamiliar. A final notion is his idea of a social membrane, meaning that as human beings we are all connected. If we are able to feel feelings and to share those feelings, then it keeps us healthy; it keeps us connected with an overall purpose and meaning as we move through transitions and changes.

Challenge is the fifth C. Achievement motivation is a significant concept, and let me take just a minute to share some of the principles. Becoming achievement oriented under conditions of change and crisis can make a difference in your ability to rise up to those expectations, take charge and do things that really make a difference.

As you consider the kinds of changes and goals that you are trying to accomplish in your life, do you really believe that your effort makes a difference when it comes to bringing about change in your system? If you are taking on the challenge of mastering computers for the first time, for example, what assumption are you making? Cause and effect thinking simply suggests that if you really do take control, if you do take charge, it will make a difference, or you can make a difference because of changing your behavior, because of grasping something and running with it. High standards of excellence go with achievement. High standards of excellence go with change. High standards of excellence obviously accompany

being successful in whatever you do but not trying to be perfectionistic like a computer.

Self-set goals, or the notion of participation in setting a goal, are critical, as is the element of moderate risk. Here is where our perception comes in. If we really think about these challenges--change, transition, mastering, or at least being effectively engaged in technology--that is a little intimidating, a bit awesome when we stand back and look at it. But this principle suggests that you need to come to grips with an assessment of the probabilities of failure versus those of success. If you really believe that your effort can make a difference, that strong application of your skills and thinking ability will work, the chances are that you can bring about a whole lot of change. But I believe the risk factor is so critical that if you have assessed there is about one chance in ten of succeeding, you ought to reevaluate before you begin. On the other hand, you may assume that this is no problem, there is only one chance in ten of failing, then I suggest that you are not sufficiently challenged and need to reevaluate that one, too. If you are not challenged, if you are not really into it, the chances are you are not going to work hard enough to make any significant difference. So whether it is too easy or too hard, you need to look at goals for change and transition as something that you can do but with effort, commitment and heavy investment on your part.

Finally, taking full responsibility for your own behavior--as grownups we may have the same difficulty with this that our teenagers do. If somebody suggests that you go buy a computer and establish a system, and if you have had very little input into this goal and it does not work, then whose problem is it? Whose challenge is this? Before you do something that makes a significant difference, find out whether you are willing to take the responsibility and hold yourself accountable.

Two more C's to go--one of them is conflict. Inevitably, when you are trying to bring about change, you will have conflict. If an administrator has conflict with a counselor, or a counselor with a teacher, or the teacher with the school psychologist, etc., there are ways to resolve the conflict that make a difference not only in the achievement of a successful resolution, but also in the amount of stress that goes into the effort. Let me quickly describe the Thomas Kilman model and his five conflict-handling modes, because the style that we adopt in bringing about resolution in our differences of opinion is so critical. Obviously, the ideal is collaboration. Many of us, however, get into the old win-lose, competitive thought pattern that if I don't have it my way, then I may come out a loser. Or, equally

unacceptable I think, is simply to accommodate or give in to what the administrator wants without challenge, but there is very little commitment or real change with that kind of accommodation. I also do not like compromise, because it says we are going to settle for something far less than what is possible. I doubt, except perhaps in labor negotiation and comparable situations, that this is the way to resolve the kind of conflict we are talking about. Avoidance, the last option, may be appropriate for certain "diplomatic" reasons, but certainly not something you would want to do routinely.

Finally, cause--the last of the seven C's is cause. What is the cause of the stress or anxiety I am experiencing? Most of us try to resolve the stress in our lives by dealing with symptoms--with what is out there, with what they are doing to me, or with this highly complex, highly frustrating computer system I am trying to have installed. That is not the stress; it does not cause you stress. The assumptions you make about it and the attitude you take towards it do cause stress. I can give you lots of research to substantiate that, but I will simply suggest it is not the thing out there you need to be most concerned about, but the way you are processing your thinking relative to what you are trying to accomplish.

Let me put this all into context by summarizing what I feel are major causes of stress. Simply because we are human beings, there are problems of self-esteem. Of course, school counselors work forever with kids on this issue, but I think as counselors, administrators, teachers and professionals our own self-worth and our own self-esteem are equally powerful. If we assume that if we do not master this system in a very short period, somehow we are no good, we are eroding a very precious commodity which we all need--our own sense of self-worth.

Other causes are lack of focus, fear of loss, conflicts in thinking, and boredom. Interestingly enough, boredom--if you do not set goals, if you don't set challenges, the chances are the stress that you feel may be not enough challenge. Computers, as powerful as they are, can be monotonous and boring. If all you are interested in is something to do filing, then it seems to me you are not looking at the computer in light of what its true capability might be, and you are going in the wrong direction. The computer can do a lot of filing, but many other methods can also file and maybe at even less expense.

Let's consider environmental influences just a minute. Some of you may qualify, again, as carriers of stress, others as recipients, for example, with authoritarian management. If people really are not allowed to have a say in what

they intend to do, they may wind up practicing malicious obedience, doing precisely what they are told with no exercise of initiative, risk, or taking hold of a situation. Ambiguous organizational goals are also the kinds of things that make a difference when we are trying to understand the nature of stress and the system that we are part of.

What can we do about it? Let me suggest a few quick ideas. I think what is really important, and people have trouble doing it, is to decide what it is you really want. Do you want to bring about this change, or are you simply following what somebody has asked you to do? Think about it. Where is the goal driver coming from? From inside you? Or from this environment, in this system that you are a part of? The favorite lingo of people who are strongly perfectionistic is to say to themselves constantly, and drive their blood pressure right up, "I should have been able to do that better. If I had only worked a little harder, and maybe, just maybe, if I stay longer, try harder, and do not make any mistakes, I am going to be okay."

Perfectionism is not the province of the human being. Excellence is. I suggest you relax: be in touch with your feelings, set goals where your effort can make a difference, and very importantly, take baby steps in bringing about change. Do not try to do it all at once because it is not going to work; you are just going to back yourself up.

Computers are very frightening because they work lightning fast. You don't. You hold onto old thinking processes. You hold onto old habits. If you are thinking about personal goals, set goals that can move you forward but do it in small, easy steps; be sure it is something you are excited about, that will give you fun, and that you can build on to make a success pattern. Don't try to change too quickly. Holmes and Rahe are right in the sense that if you bring about too much change in too short a period, you could make yourself sick. Don't do that--do yourself a favor.

I would like to end with the observation that I do not think there are any answers to this business of managing stress. It has to do with what we are willing to do to learn about the nature of stress and change while we are trying to bring about more health and more effectiveness in our lives. What I said earlier is very important, and that is to be in touch with feelings. If I am feeling stress, if I am having some concerns about what I am going through in bringing about change, what is the nature of that feeling? That is where we have to start, with becoming aware of our emotions because they are such powerful drivers.